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UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

6121352

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Disperse azo dye mixtures

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**INVENTOR:** Hoppe, Manfred - Kurten, Germany (DE); Himeno, Kiyoshi - Fukuoka, Japan (JP); Sekioka, Ryouichi - Kitakyusyu, Japan (JP)

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**ASSIGNEE-AT-ISSUE:** Dystar Textilfarben GmbH & Co., Germany (DE), 03

**ASSIGNEE-AFTER-ISSUE:** March 18, 1999 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., DYSTAR TEXTILFARBEN GMBH & CO. D60318 FRANKFURT GERMANY, Reel and Frame Number: 09837/0191

**LEGAL-REP:** Connolly Bove Lodge & Hutz LLP

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**IPC-MAIN-CL:** 7C 08K005#34

**IPC ADDL CL:** D 06P003#82

**PRIM-EXMR:** Sanders, Kriellion

**REF-CITED:**

04795807, January, 1989, Buhler et al., United States (US), 524058  
05174792, December, 1992, Tsumura et al., United States (US), 008639  
229422, November, 1985, Germany (DE)  
2030169, April, 1980, Great Britain (GB)  
1582743, January, 1981, Great Britain (GB)

**NON-PATENT LITERATURE:** Chemical Abstract, vol. 114, (1991), p. 101, Abstract No. 145436d and CN- A 1 036 974. Preparing N-cyanoethyl-N-benzylaniline derivatives for disperse azo dyes.

**CORE TERMS:** sub, dye, formula, mixture, sup, dyeing, preparation, dispersant, optionally, polyester, hydrogen, liquor, hydrophobic, substituent, printing, grinding, sodium, mixing, independently, auxiliaries, synthetic, fastness, halogen, drying, dried, print, heat treatment, total amount, ligninsulphonate, substituted

**ENGLISH-ABST:**

The present invention relates to dye mixtures comprising at least one compound of the formula (I) ##STR1## and at least one compound of the formula (II) ##STR2## where the substituents are each as defined in the description part, which are highly useful for dyeing and printing hydrophobic synthetic material.

**NO-OF-CLAIMS:** 12

**EXMPL-CLAIM:** 1

**SUMMARY:**

The invention relates to disperse azo dye mixtures, processes for their preparation and to their use for dyeing and printing hydrophobic synthetic materials.

It is an object of the present invention to provide navy to black disperse dye mixtures having good application properties.

The invention accordingly provides a dye mixture comprising at least one dye of the formula (I) ##STR3## where R<sup>sup.1</sup> is hydrogen, C<sub>sub.1</sub> - C<sub>sub.4</sub> -alkyl, halogen, especially Cl and Br, or C<sub>sub.1</sub> -C<sub>sub.4</sub> - alkoxy,

n is 1 or 2, and the

ring A is optionally substituted, possible substituents being one or more identical or different substituents, preferably C<sub>sub.1</sub> -C<sub>sub.4</sub> - alkyl, especially CH<sub>sub.3</sub>, and also halogen, especially Cl and Br,

and at least one dye of the formula (II) ##STR4## where X is halogen, especially Cl and Br, or CN,

R<sup>sup.2</sup> and R<sup>sup.5</sup> are independently hydrogen or C<sub>sub.1</sub> -C<sub>sub.4</sub> - alkyl, and

R<sup>sup.3</sup> and R<sup>sup.4</sup> are independently hydrogen, optionally substituted C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl or C<sub>sub.2</sub> -C<sub>sub.4</sub> -alkenyl,

possible substituents for alkyl being preferably selected from - OH, - -CN, - -OCOR, --OCOC<sub>sub.6</sub> H<sub>sub.5</sub>, --OCOOR, --COOR, --OC<sub>sub.6</sub> H<sub>sub.5</sub>, - - C<sub>sub.6</sub> H<sub>sub.5</sub> and/or C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkoxy, R being hydrogen or C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl.

Dyes of the formula (I) are known for example from CN-A-1 036 974 (= CA 114: 145 436) and dyes of the formula (II) for example from DE- A-2 818 653.

Preferred mixtures contain compounds of the formula (I) where the ring A does not bear any further substituents. Particular preference is given to compounds of the formula (I) where R<sup>sup.1</sup> is hydrogen or C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl, especially methyl. Very particular preference is given to mixtures of the invention which comprise the dye of the formula (I) where n is 1, R<sup>sup.1</sup> is hydrogen or methyl, and the ring A is not further substituted.

Preferred mixtures contain a dye of the formula (II) where X is halogen, especially Cl or Br. Particularly preferred dyes of the formula (II) are those

where

R<sup>sup.3</sup> and R<sup>sup.4</sup> are independently hydrogen, C<sub>sub.2</sub> -C<sub>sub.4</sub> - alkenyl, unsubstituted C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl or ROCO--, NC-- or ROOC-substituted C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl, R being as defined above.

In particular, in the formula (II), R<sup>sup.2</sup> and R<sup>sup.5</sup> are independently C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl, preferably CH<sub>sub.3</sub>.

Particularly preferred mixtures according to the invention are those which contain at least one dye of the formula (I) selected from the group: ##STR5## and at least one dye of the formula (II) selected from the group: ##STR6##

Preference is further given to mixtures of the invention which additionally contain a further dye of the formula (III), (IV) and/or (V) ##STR7## and/or ##STR8## where x<sup>sup.1</sup> is halogen, especially Cl and Br, or CN,

X<sup>sup.2</sup> is halogen, especially Cl and Br, hydrogen, NO<sub>sub.2</sub> or CN,

R<sup>sup.6</sup> is C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl,

R<sup>sup.7</sup> and R<sup>sup.8</sup> are independently hydrogen, unsubstituted or HO--, NC--, ROCO--, H<sub>sub.5</sub> C<sub>sub.6</sub> OCO--, (C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl) OOCO- -, ROOC--, H<sub>sub.5</sub> C<sub>sub.6</sub> O--, H<sub>sub.5</sub> C<sub>sub.6</sub> - and/or C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkoxy-substituted C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl or C<sub>sub.2</sub> -C<sub>sub.4</sub> -alkenyl, R being as defined above,

Y<sup>sup.1</sup> and Y<sup>sup.2</sup> are independently hydrogen or halogen, especially Cl and Br,

R<sup>sup.9</sup> and R<sup>sup.10</sup> are independently hydrogen, unsubstituted or HO--, NC--, ROCO--, H<sub>sub.5</sub> C<sub>sub.6</sub> OCO-- and/or C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkoxy-substituted C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl, R being as defined above, or C<sub>sub.2</sub> -C<sub>sub.4</sub> -alkenyl,

R<sup>sup.11</sup> is C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl, and

R<sup>sup.12</sup> is hydrogen, C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkyl or C<sub>sub.1</sub> -C<sub>sub.4</sub> -alkoxy.

Particularly preferred mixtures are those which, as well as the dyes of the formulae (I) and (II), contain a dye of the formula (III), in particular dyes of the formula (III) selected from the group (IIIa) and (IIIb): ##STR9##

Likewise particularly preferred mixtures are those which, as well as the dyes of the formulae (I) and (II), contain a dye of the formula (IV), in particular dyes of the formula (IV) selected from the group (IVa), (IVb) and (IVc) ##STR10##

Particularly preferred mixtures further include those which, as well as the dyes of the formulae (I) and (II), contain a dye of the formula (V) , especially the dye of the formula (Va) ##STR11##

The dye mixture of the invention preferably comprises 1 to 99%, preferably 1 to 80%, especially 5 to 60%, by weight of at least one dye of the formula (I) and 1 to 99%, preferably 20 to 99%, especially 40 to 95%, by weight of at least one dye of the formula (II), based on the total amount of dye.

Preference is given to using the dye of the formula (III) in an amount of 0 to 80%, especially 2 to 60%, by weight, based on the total amount of dye.